PERMIT TO CONSTRUCT EVALUATION
(REGENERATIVE THERMAL OXIDIZER)

Applicant's Name	**GREIF INDUSTRIAL PACKAGING**
Company I.D.	**142907**
Mailing Address	**8250 ALMERIA AVE., FONTANA, CA 92335**
Equipment Address	**8250 ALMERIA AVE., FONTANA, CA 92335**

EQUIPMENT DESCRIPTION

APPLICATION NO. 516716 (Replacement for P/O F72953, A/N 438002)

AIR POLLUTION CONTROL SYSTEM CONSISTING OF:

1. REGENERATIVE THERMAL OXIDIZER, SHIP & SHORE ENVIRONMENTAL, INC., MODEL NO. SSE25K95XRTO, 25,000 CFM, 10’ – 1” W X 23’ – 10” L X 13’ –1” H, DUAL CHAMBER CERAMIC MEDIA, WITH A 4,600,000 BTU/HR MAXON NATURAL GAS-FIRED BURNER, MODEL KINEDIZER-LE, A 10 H.P. COMBUSTION BLOWER , AND A NATURAL GAS INJECTION SYSTEM UP TO 1,900,000 BTU/HR.

2. LARGE DRUM SPRAY BOOTH # 1, CONVEYORIZED, FLOOR TYPE, 13'-4" W. X 16'-10" L. X 7'-10" H., WITH ONE RECIRCULATION AIR FAN AND EIGHTEEN 20” X 20” FILTERS, AND ONE 3 HP EXHAUST FAN AND TWO 20” X 20” EXHAUST FILTERS.

3. SMALL DRUM SPRAY BOOTH # 2, CONVEYORIZED, FLOOR TYPE, 8'-0" W. X 9'-0" L. X 7'-0" H., WITH TWELVE 20” X 20” EXHAUST FILTERS AND A 1 ½ HP EXHAUST FAN.

4. SMALL PARTS SPRAY BOOTH # 3, FLOOR TYPE, BINKS, 5'-0" W. X 6'-0" L. X 7’-0" H., WITH TWELVE 20" X 20" EXHAUST FILTERS, AND ONE ½ HP EXHAUST FAN.

5. EXHAUST SYSTEM WITH ONE 150 HP BLOWER, 25,000 SCFM, VENTING THREE SPRAY BOOTHS (LARGE DRUM, SMALL DRUM AND SMALL PARTS) AND TWO OVENS.

APPLICATION NO. 516815

TITLE V REVISION

HISTORY

The above applications from Greif Industry were submitted to the District to install a new regenerative thermal oxidizer (RTO) with a 4.6 mm BTU/HR natural gas-fired burner.

The applicant is proposing to install a new RTO at this location to replace an old recuperative afterburner with 5.0 mm BTU/HR. The applicant, in April 2010, was issued a permit to construct (A/N 503361) to install a new recuperative afterburner with a 9.8 mm BTU/HR burner for this project. However, the company has now decided to install a RTO instead to reduce the natural gas consumption. At present two spray booths and one oven are vented to the existing afterburner. The applicant is proposing to vent all the three spray booths and two ovens to the new afterburner. As a result, Greif Industry has already obtained a permit to modify (A/N# 506823) the oven to vent it to the afterburner. The new afterburner will be equipped with a Maxon Kinedizer LE burner with guaranteed less than 30 ppm NOx emissions @ 3% O_2, which complies with the current BACT requirements.

Greif Industrial manufactures steel drums in sizes ranging from 5 to 55 gallons. The drum manufacturing operation is performed at this location for a number of years. Recently there was a change of ownership at this location. The previous operator was Greif Brothers Corp. operating under District I.D. # 073301. The facility currently has three spray booths, two ovens and one afterburner operating with the District permits under I.D. # 142907.

Greif Industrial has a VOC emission cap of 65 pounds per day. The applicant requested to maintain the same 65 pounds per day VOC cap under this project. The applicant has not requested any changes in the manufacturing process or the materials under this project. Rules 1125 and 1171 apply to this facility and the above described equipment.

The district database shows no complaints on file in the last two years against this facility. One notice to comply was issued in last two years to provide records. One notice of violation was issued to the facility for not submitting annual compliance certificate. The company was operating in compliance upon follow-up inspections.

This facility is not located within 1000 feet from any school and there will not be any emission increases exceeding Rule 212 thresholds from this project, hence, these applications will not require a public notice.

A Title V renewal permit for this facility was issued on September 3, 2008. The proposed project is considered as a "minor permit revision" to the renewed Title V permit, as described in the Regulation XXX evaluation. This is the second revision since the TV permit renewal was issued.

PROCESS DESCRIPTION

This is a steel drum manufacturing facility. The drums are manufactured from sheets of steel. The sheets are cut to size, formed to desired shape, welded, coated in spray booths and dried in ovens. The facility has two drum manufacturing lines with two spray booths and one oven vented to a air pollution control system. The spray booths are enclosed and the conveyors are used to transfer the parts to the oven. The conveyors are in enclosed tunnels. Under this project the applicant proposes to vent one additional spray booth and oven to a new RTO. The applicant is proposing to enclose the spray booth and the conveyor for the additional spray booth to be vented to the new RTO to increase the VOC collection efficiency. The new RTO will be capable to handle the extra contaminated air.

The RTO is capable of processing 25,000 CFM contaminated air from the spray booths and associated drying/curing ovens. This regenerative thermal oxidizer is initially heated to about 1500^0 F by a startup burner, which supplies heat to the Lantech MLM-200 ceramic media. This media is located in two process zones. The hot exhaust air goes to the one ceramic bed and transfer the heat to the media. The thermal energy recovery rate is at least 95%. The contaminated air switches every two minutes between the two ceramic beds. If the VOC in the contaminated stream is not sufficient to sustain the temperature then gas is injected into the RTO. This equipment is expected to meet the VOC BACT requirements by achieving a minimum 90% collection efficiency and at least 95% destruction efficiency, overall VOC control efficiency of 95%. A source test will be conducted to verify the collection and destruction efficiencies.

The facility uses Precision coatings in the spray booths with maximum VOC content of 1.07 pounds per gallon, which comply with the Rule 1125 VOC requirements.. The VOC content of the clean-up material is 0.2 lbs/gal, which complies with the Rule 1171 requirements. All the VOC emissions will be vented to the RTO.

OPERATING HOURS

Average: 24 hr/day, 7 day/week, 52 weeks/year
Maximum: 24 hr/day, 7 day/week, 52 weeks/year

OXIDIZER DESIGN

Design capacity of the control equipment:	25,000 cfm
Inlet operating temperature	70^0 F
Outlet operating temperature from combustion chamber	1500^0 F
Heat exchanger efficiency:	95%
Heat Input Rating of the burner for initial heating of the media	4.6 mm BTU/HR
Volume of the combustion zone	1518.75 ft^3

Heat required to heat air from spray booths from 70 ^{0}F to 1500 ^{0}F

M = 25000 scfm x 0.075 lb/scf x 60 min/hr = 112,500 lb/hr

Cp_{70} = 0.240 Btu/lb ^{o}F Cp_{1500} =0.275 Btu/lb ^{o}F
Cp_{avg} = 0.258 Btu/lb ^{o}F

Q = MCp ΔT
= 112500 x 0.258 x (1500 - 70)
= 41.51 MM Btu/hr

After 95% heat recovery

Q= 41.51 x 0.05 = 2.08 MM Btu/hr

Heat input needed: 2.08 X 1050/615 = 3.55 mm BTU/HR. (Table D7, Page 948, AP 40.)

The applicant will use the burner to start-up the RTO only. The natural gas injection and the VOCs will maintain the temperature in the combustion chamber. The RTO will have a burner rated at 4.6 x 10^6 Btu/hr for start-up, which is sufficient to fire-up the RTO. The permit condition will require a source test upon completion of the installation, which will prove the design capacity. A permit condition will also limit the use of the burner for start-up operation only.

Residence time calculations

Flow rate = 25000 cfm
Flow rate per minute = 25000 cfm / 60 sec/min = 417 cfs
Corrected volume = 417 cfs x 1960/ 530 = 1542 cfs (1500 ^{o}F to 70 ^{o}F)
Combustion zone volume = 1518.75 cubic feet
Residence time = 1518.75 / 1542 = 0.98 sec
(Greater than 0.5 sec is recommended - OK)

EMISSION CALCULATIONS

RTO will be equipped with a low NOx burner. It will take two hours maximum to get the ceramic bed up to the temperature (1500° F).

A/N 516716 Ship & Shore RTO @

	maximum	normal		
hr/dy	24	2	max heat input	4.60E+06 (BTU/hr)
dy/wk	7	7	gross heating value	1050 (BTU/scf)
wk/yr	52	52		
load	100%	100%		

	Emission Factors	MAX (lb/hr)	AVE (lb/hr)	MAX (lb/dy)	30-DAY (lb/dy)	MAX (lb/yr)	MAX (ton/yr)
SO_2 (R1)	0.6	0.003	0.003	0.063	NA	23	0.011
SO_2 (R2)	0.6	0.003	0.003	0.063	0.063	23	0.011
NO_2 (R1)	38.94	0.171	0.171	4.094	NA	1,490	0.745
NO_2 (R2)	38.94	0.171	0.171	4.094	4.094	1,490	0.745
CO (R1)	39.5	0.173	0.173	4.153	NA	1,512	0.756
CO (R2)	39.5	0.173	0.173	4.153	4.153	1,512	0.756
TOC (R1=R2)	7	0.031	0.031	0.736	NA	268	0.134
N_20 (R1=R2)	2.2	0.010	0.010	0.231	0.231	84	0.042
PM, PM_{10} (R1=R2)	7.5	0.033	0.033	0.789	0.789	287	0.144
Hexane	0.0063	2.8E-05	2.8E-05	6.6E-04	NA	2.41E-1	1.21E-4
Ammonia	3.2	1.4E-02	1.4E-02	3.4E-01	NA	1.22E+2	6.12E-2
ethyl benzene	0.0095	4.2E-05	4.2E-05	1.0E-03	NA	3.64E-1	1.82E-4
acetaldchyde	0.0043	1.9E-05	1.9E-05	4.5E-04	NA	1.65E-1	8.23E-5
acrolein	0.0027	1.2E-05	1.2E-05	2.8E-04	NA	1.03E-1	5.17E-5
benzene	0.008	3.5E-05	3.5E-05	8.4E-04	NA	3.06E-1	1.53E-4
formaldehyde	0.017	7.4E-05	7.4E-05	1.8E-03	NA	6.51E-1	3.25E-4
napthalene	0.0003	1.3E-06	1.3E-06	3.2E-05	NA	1.15E-2	5.74E-6
PAH's	0.0001	4.4E-07	4.4E-07	1.1E-05	NA	3.83E-3	1.91E-6
toluene	0.0366	1.6E-04	1.6E-04	3.8E-03	NA	1.40E+0	7.00E-4
xylenes	0.0272	1.2E-04	1.2E-04	2.9E-03	NA	1.04E+0	5.20E-4

NO_2 @ 3% excess O_2 ---->>>	30.00	(ppmv)	SO_2 @ 3% excess O_2 ---->>>	0.33	(ppmv)
CO @ 3% excess O_2 ---->>>	49.98	(ppmv)	PM @ 12% CO_2 ---->>>	5.5E-09	(grain/ft^3)

The new RTO with 4.6 MM Btu/hr heat input is replacing existing recuperative direct-flame afterburner with 5 MM Btu/hr heat input. Both afterburners have low NOx Maxon Kinedizer LE burners. There will be reduction in combustion emissions under this project. Please refer to following Tables for combustion emissions from the existing afterburner.

Existing Afterburner

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	maximum	normal		
hr/dy	24	8	max heat input	5.00E+06 (BTU/hr)
dy/wk	7	7	gross heating value	1050 (BTU/scf)
wk/yr	52	52		
load	100%	75%		

	Emission Factors	MAX (lb/hr)	AVE (lb/hr)	MAX (lb/dy)	30-DAY (lb/dy)	MAX (lb/yr)	MAX (ton/yr)
SO_2 (R1)	0.6	0.003	0.002	0.069	NA	25	0.012
SO_2 (R2)	0.6	0.003	0.002	0.069	0.069	25	0.012
NO_2 (R1)	38.94	0.185	0.139	4.450	NA	1,620	0.810
NO_2 (R2)	38.94	0.185	0.139	4.450	4.450	1,620	0.810
CO (R1)	39.5	0.188	0.141	4.514	NA	1,643	0.822
CO (R2)	39.5	0.188	0.141	4.514	4.514	1,643	0.822
TOC (R1=R2)	5.8	0.028	0.021	0.663	0.663	241	0.121
N_20 (R1=R2)	2.2	0.010	0.008	0.251	0.251	92	0.046
PM, PM_{10} (R1=R2)	7.5	0.036	0.027	0.857	0.857	312	0.156
Hexane	0.0063	3.0E-05	2.3E-05	7.2E-04	NA	2.62E-1	1.31E-4
Ammonia	3.2	1.5E-02	1.1E-02	3.7E-01	NA	1.33E+2	6.66E-2
ethyl benzene	0.0095	4.5E-05	3.4E-05	1.1E-03	NA	3.95E-1	1.98E-4
acetaldchyde	0.0043	2.0E-05	1.5E-05	4.9E-04	NA	1.79E-1	8.94E-5
acrolein	0.0027	1.3E-05	9.6E-06	3.1E-04	NA	1.12E-1	5.62E-5
benzene	0.008	3.8E-05	2.9E-05	9.1E-04	NA	3.33E-1	1.66E-4
formaldehyde	0.017	8.1E-05	6.1E-05	1.9E-03	NA	7.07E-1	3.54E-4
napthalene	0.0003	1.4E-06	1.1E-06	3.4E-05	NA	1.25E-2	6.24E-6
PAH's	0.0001	4.8E-07	3.6E-07	1.1E-05	NA	4.16E-3	2.08E-6
toluene	0.0366	1.7E-04	1.3E-04	4.2E-03	NA	1.52E+0	7.61E-4
xylenes	0.0272	1.3E-04	9.7E-05	3.1E-03	NA	1.13E+0	5.66E-4
Propylene	0.731	3.5E-03	2.6E-03	8.4E-02	NA	3.04E+1	1.52E-2

NO_2 @ 3% excess O_2 ------>>>	30.00	(ppmv)	SO_2 @ 3% excess O_2 ------>>>	0.33	(ppmv)
CO @ 3% excess O_2 ------>>>	49.98	(ppmv)	PM @ 12% CO_2 ------>>>	5.5E-09	(grain/ft^3)

Toxic Compound Emissions and Risk Assessment

A Tier 2 Risk Assessment was performed to determine the health risk from the toxic air contaminants emitted from the combustion of natural gas under this project. At the worst case scenario, the assessment calculated a cancer risk of 0.289 in a million (2.89E-07) for the residential receptor and 0.139 in a million (1.39E-07) for a commercial receptor. The assessment also calculated both acute and chronic hazard index risks and all the risks were below 1. Thus, the Tier 2 risk assessment demonstrated compliance with the Rule 1401 requirements.

This RTO will replace a direct-fired afterburner, where there will be reduction in toxic emissions from the project.

RULES/REGULATION EVALUATION

¤***RULE 212, PUBLIC NOTIFICATION***
v***SECTION 212(c)(1):***
This section requires a public notice for all new or modified permit units that may emit air contaminants located within 1,000 feet from the outer boundary of a school. This source is not located within 1,000 feet from the outer boundary of a school. Therefore, public notice will not be required by this section.

v ***SECTION 212(c)(2):***
This section requires a public notice for all new or modified facilities which have on-site emission increases exceeding any of the daily maximums as specified in subdivision (g). This is a replacement with decrease in combustion emissions. As shown in the following table, the emission increases from this project are below the daily maximum limits specified by Rule 212(g). Therefore, public notice will not be required by this section.

LB/DAY	CO	NOX	PM_{10}	ROG	Lead	SOX
MAX. LIMIT	220	40	30	30	3	60
INCREASES	0	0	0	0	0	0

v ***SECTION 212(c)(3):***
See Rule 1401 evaluation section. Public notice is not required by this section. There is no toxic emission increase from the use of coatings in this equipment since the VOC cap will remain the same. The toxic emission from the combustion of natural gas in the new RTO results in MICR below 1 in a million. Therefore, this application will not be subject to this section.

v ***SECTION 212(g):***

This section requires a public notice for all new or modified sources which undergo construction or modifications resulting in an emissions increase exceeding any of the daily maximum specified in the table below. As shown in the following table, the emission increases from this project are below the daily maximum limits specified by Rule 212(g). Therefore, public notice will not be required by this section.

LB/DAY	CO	NOX	PM_{10}	ROG	Lead	SOX
MAX. LIMIT	220	40	30	30	3	60
INCREASES	4.2	4.1	0.79	0.74	0	0

¤***RULES 401 & 402, VISIBLE EMISSIONS & NUISANCE***

AQMD database has no records of any visible emissions or nuisance violations against this company in the last two years.

¤ ***RULE 1125, METAL CONTAINER, CLOSURE, AND COIL COATING OPERATIONS***

v ***SECTION (C)(1), VOC CONTENT OF COATING***

The applicant is in compliance with these requirements by using following compliant coatings. Information obtained from the previous application (# 503361) evaluation.

Coating Category	VOC Content (lbs/gal)	
	Rule Limit	Actual
Precision Coatings Red, Blue, Green	2.8 (Exterior)	1.07
	3.5 (Interior)	1.07

¤ ***RULE 1125, METAL CONTAINER, CLOSURE, AND COIL COATING OPERATIONS***

v ***SECTION (C)(4),TRANSFER EFFICIENCY***

The use of HVLP spray equipment complies with transfer efficiency requirements.

¤ ***RULE 1171, SOLVENT CLEANING OPERATIONS***

The applicant is in compliance with these requirements by using following compliant solvent. Information obtained from the previous application (# 503361) evaluation.

Coating Category	VOC Content (lbs/gal)	
Precision Coatings 18C5907	Rule Limit	Actual
	0.25	0.2

REGULATION XIII

¤ ***RULE 1303(a), BEST AVAILABLE CONTROL TECHNOLOGY (BACT)***

(a) VOC EMISSIONS

VOC emissions from spray booths and ovens will be vented to an air pollution control system consisting of a RTO with a sufficient VOC control efficiency (at least 90% collection, 95% destruction and 90% overall). This will comply with the provisions of the current BACT requirements.

(a) NOx EMISSIONS

The manufacturer has guaranteed the NOx emissions to be 30 ppmv at 3% oxygen level to comply with the current BACT requirements. A permit condition will require to source test the equipment to show compliance with these requirements.

¤ ***RULE 1303(b)(1), MODELING***

Screening modeling analysis is not required since emission increases are below the Table A-1 allowable emissions, for NOx emissions <0.20 lbs/hr (calculated 0.17 lbs/hr), CO emissions <11.0 lbs/hr (calculated 0.17 lbs/hr) and PM10 emissions <1.2 lbs/hr (calculated 0.033 lbs/hr).

¤ ***RULE 1303 (b)(2), EMISSION OFFSETS***

There will be no emission increase in the emissions under this project. Thus, no offsets are required for this project.

¤ ***RULE 1401, NEW SOURCE REVIEW OF CARCINOGENIC AIR CONTAMINANTS***

As discussed in this evaluation report, this equipment is expected to comply with the rule requirements. (MICR from the combustion of the natural gas is expected to be less than 1×10^{-6} and HIA &HIC to be below 1.)

REGULATION XXX

The proposed project is considered as a "minor permit revision" to the current Title V permit for this facility since there is not an emission increase of pollutants subject to Reg. XIII or hazardous air pollutants. The current proposed RTO (A/N 516716) results in slightly less emissions compared to the emissions from the recuperative afterburner (A/N 503361)that was never constructed and put into operation. Rule 3000(b)(12) defines a "minor permit revision" as any Title V permit revision that does not result in any of the following:

- Emission increase of RECLAIM pollutants over the facility starting Allocation plus nontradeable Allocations, or a higher Allocation amount which has previously undergone a significant permit revision process,

- Emission increase in hazardous air pollutants (HAPs) or pollutants subject to Reg. XIII, or
- Installation of a new permit unit or the modification or reconstruction of an existing permit unit subject to a New Source Performance Standard (NSPS) per 40 CFR Part 60 or a National Emission Standard for HAPs per 40 CFR Part 61 or Part 63.

Rule 3003(j) specifies that all proposed Title V permit revisions shall be submitted to EPA for review. This is the second permit revision requested by the facility. The cumulative emission increases resulting from this proposed permit revision are summarized as follows:

Revision	HAP	VOC	NOx	PM_{10}	SOx	CO
1st Revision. Install new afterburner (A/N 503361) and vent additional Oven (A/N 506823). Afterburner permit deleted in 2nd revision.	0	1	4	1	0	4
2nd Revision. Install new RTO (A/N 516716)	0	1	4	1	0	4
2nd Revision. Delete afterburner (A/N 503361). See 1st Revision	0	-1	-4	-1	0	-4
Total	0	1	4	1	0	4
Maximum Daily	30	30	40	30	60	220

CONCLUSIONS/RECOMMENDATIONS

The proposed project is expected to comply with all applicable District Rules and Regulations. Since the proposed project is considered as a "minor permit revision", it is exempt from the public participation requirements under Rule 3006 (b). A proposed permit incorporating this permit revision will be submitted to EPA for a 45-day review pursuant to Rule 3003(j). If EPA does not have any objections within the review period, a revised Title V permit will be issued to this facility.